

In the Claims

1. (TWICE AMEND) A method for forming a multi-layer wiring structure, comprising the following steps:

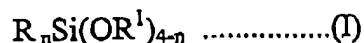
etching via-holes or wiring gutter through a resist mask on a silica based insulating film between layers having dielectric constant being equal to or less than 3.5;

performing an ashing process on said resist mask using oxygen gas plasma under an atmospheric pressure from 0.01 Torr to 30.0 Torr; and

filling up said wiring gutters or said via-holes with conductive material.

3. (TWICE AMEND) A method for forming a multi-layer wiring structure, as described in claim 1, wherein said silica based insulating film between layers contains carbon from 5 % by atomic weight to 25 % by atomic weight.

4. (TWICE AMEND) A method for forming a multi-layer wiring structure, as described in claim 1, wherein said silica based insulating film between layers is formed by coating and baking a coating liquid including a chemical compound, being obtained through hydrolysis and condensation reaction of at least one kind of alkoxysilane compounds in organic solvent under presence of an acid catalyst, wherein said one kind of alkoxysilane compounds is selected from alkoxysilane compounds expressed by the following general equation(I):



wherein, R in the general equation (I) indicates an alkyl group having carbon number from 1 to 4 or an aryl group, R¹ indicates an alkyl group having carbon number from 1 to 4, and n indicates an integer from 1 to 2.

8. (TWICE AMEND) A method for forming a multi-layer circuit board, as described in claim 1, wherein said silica based insulating film between layers is formed by coating with a coating liquid, and baking said coating liquid, which is obtained from a solution of a solvent of alkyleneglycol-dialkyl ether containing acid hydrolysis condensation product of trialkoxysilane,

and which shows an increase in weight when performing thermogravimetric measurement on a component forming the film after removing the solvent.

9 (AMEND) A method for forming a multi-layer wiring structure, comprising the following steps:

DA (a) etching to form via-holes or wiring gutters through a resist mask on a silica based insulating film between layers having a dielectric constant being equal to or less than 3.4, said silica based insulating film between layers containing carbon from 5% by atomic weight to 25% by atomic weight;

W (b) performing an ashing process on said resist mask using oxygen gas plasma under an atmospheric pressure from 0.01 Torr to 30.0 Torr; and

(c) filling up said wiring gutters or said via-holes with conductive material.
